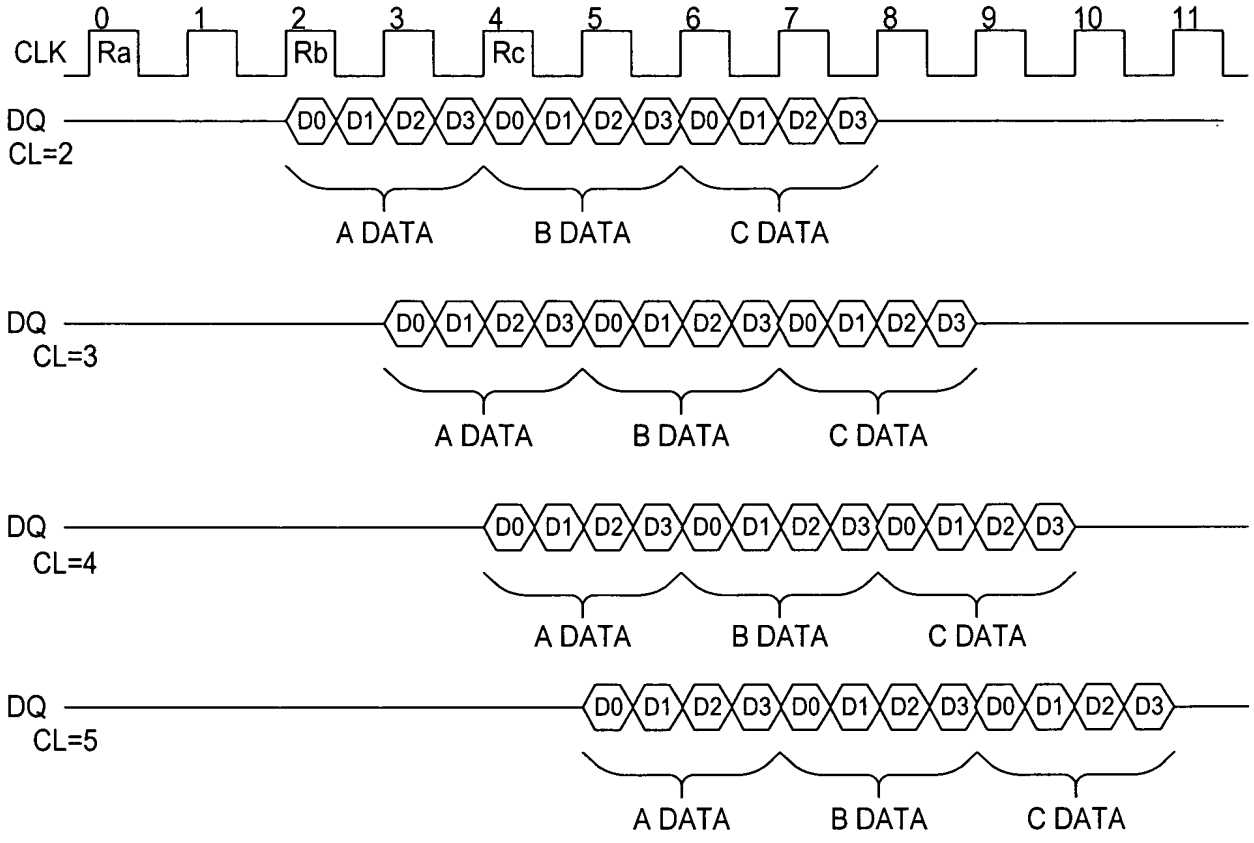


FIG. 1 PRIOR ART

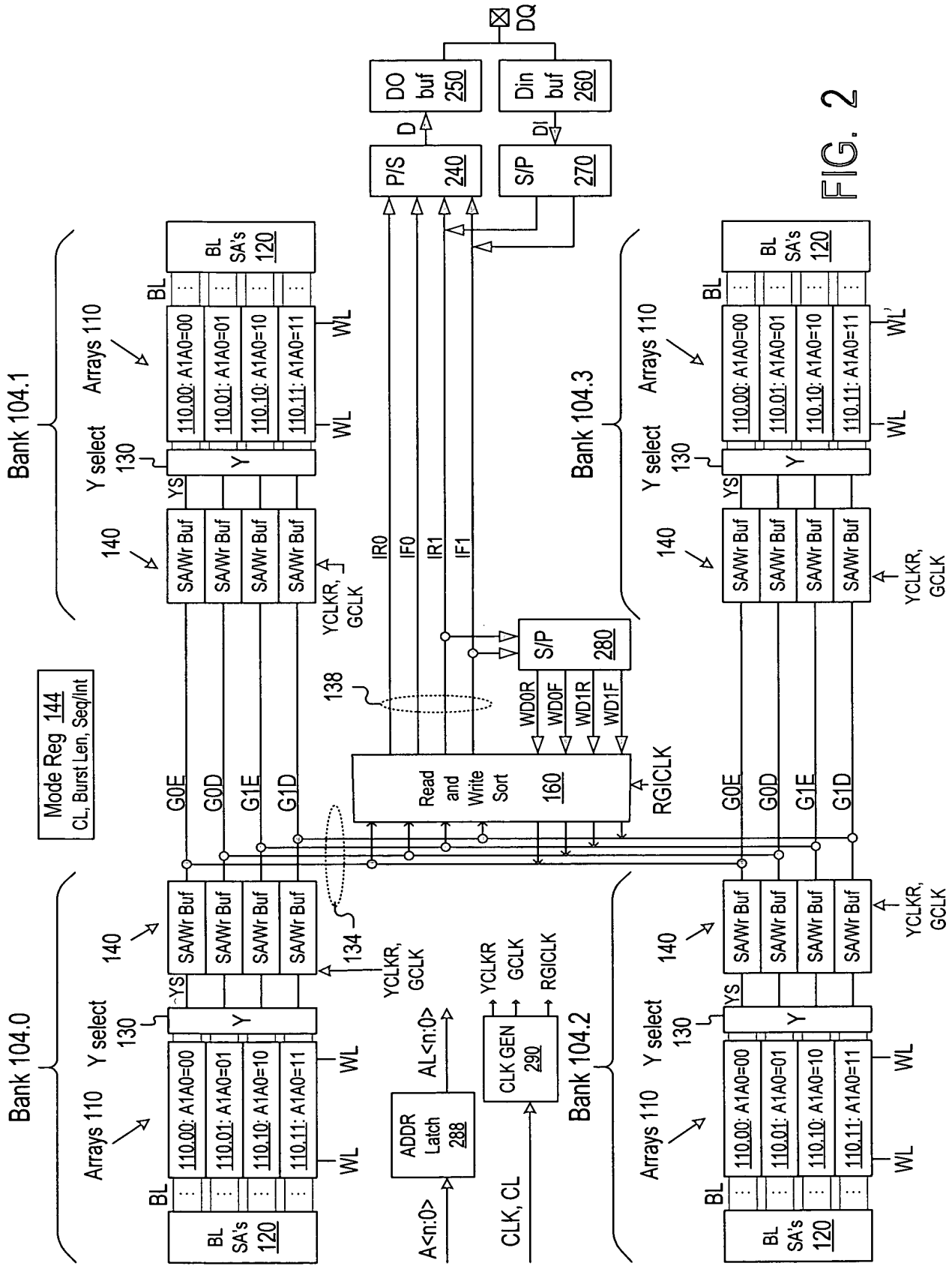
DQ
DO buf 250
Din buf 260
D
DI
P/S 240
S/P 270
Bank 104.1
Bank 104.3
Bank 104.0
Bank 104.2
Arrays 110
Y select 130
140
BL SA's 120
110.00: A1A0=00
110.01: A1A0=01
110.10: A1A0=10
110.11: A1A0=11
WL
BL
YS
Y
SA/Wr Buf
Mode Reg 144
CL, Burst Len, Seq/Int
G0E
G0D
G1E
G1D
IR0
IF0
IR1
IF1
138
134
S/P 280
WD0R
WD0F
WD1R
WD1F
Read and Write Sort 160
RGICLK
YCLKR, GCLK
ADDR Latch 288
AL<n:0>
A<n:0>
CLK GEN 290
CLK, CL

FIG. 2

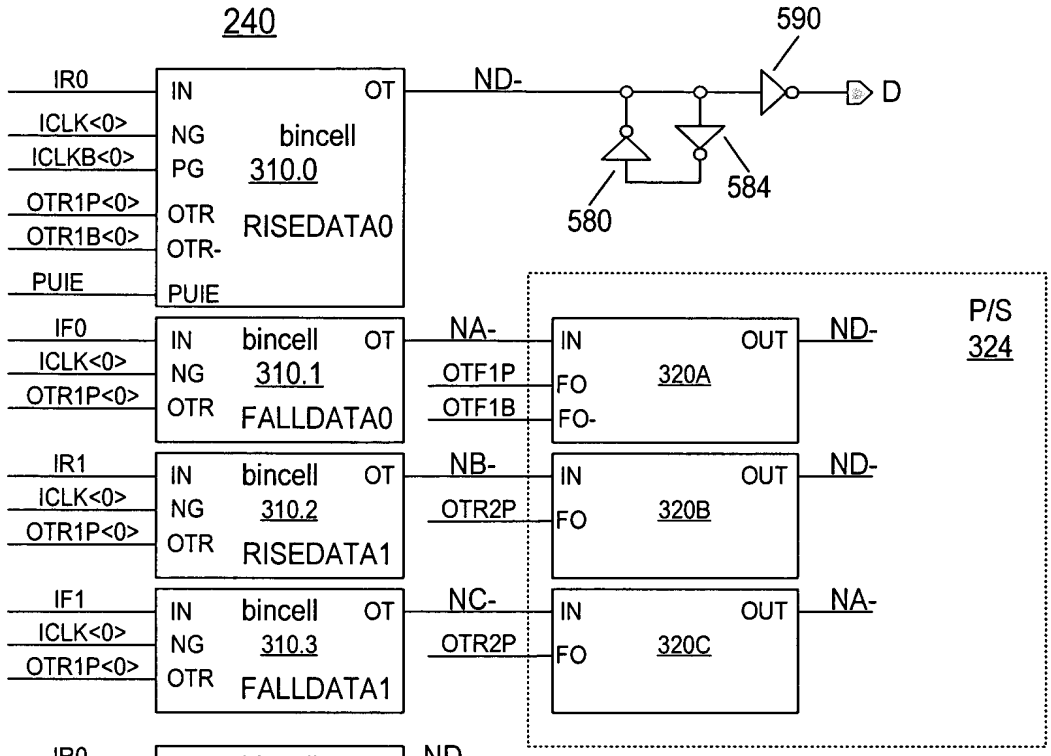


FIG. 3

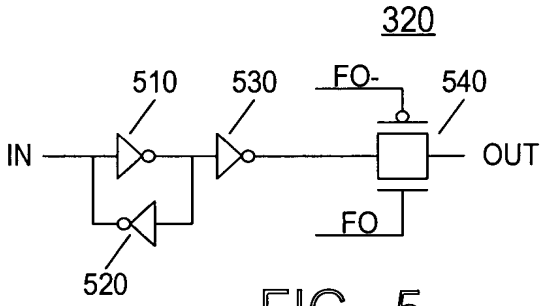


FIG. 5

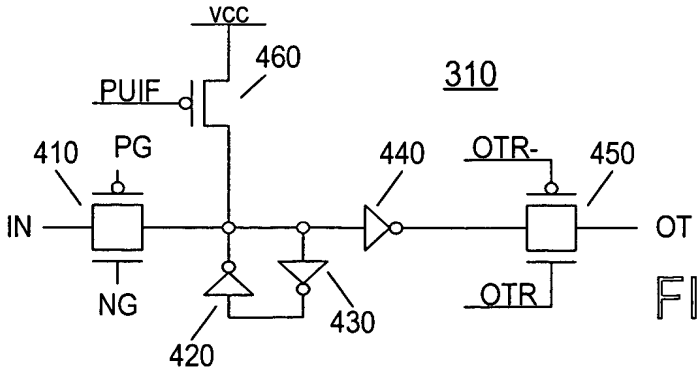


FIG. 4

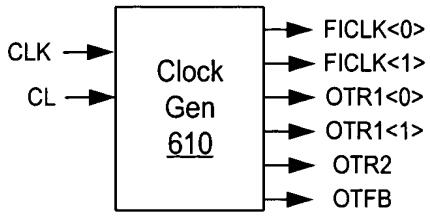


FIG. 6A

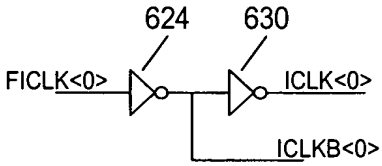


FIG. 6B

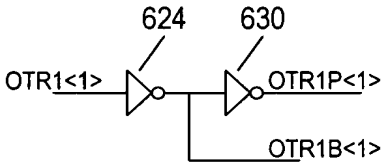


FIG. 6E

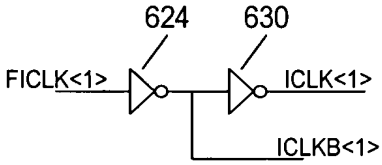


FIG. 6C

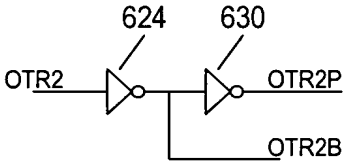


FIG. 6F

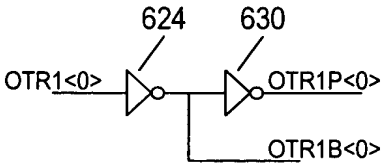


FIG. 6D

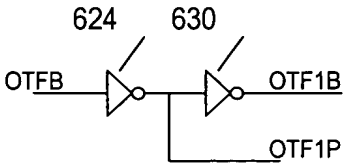


FIG. 6G

DDR2 CL=2 READ

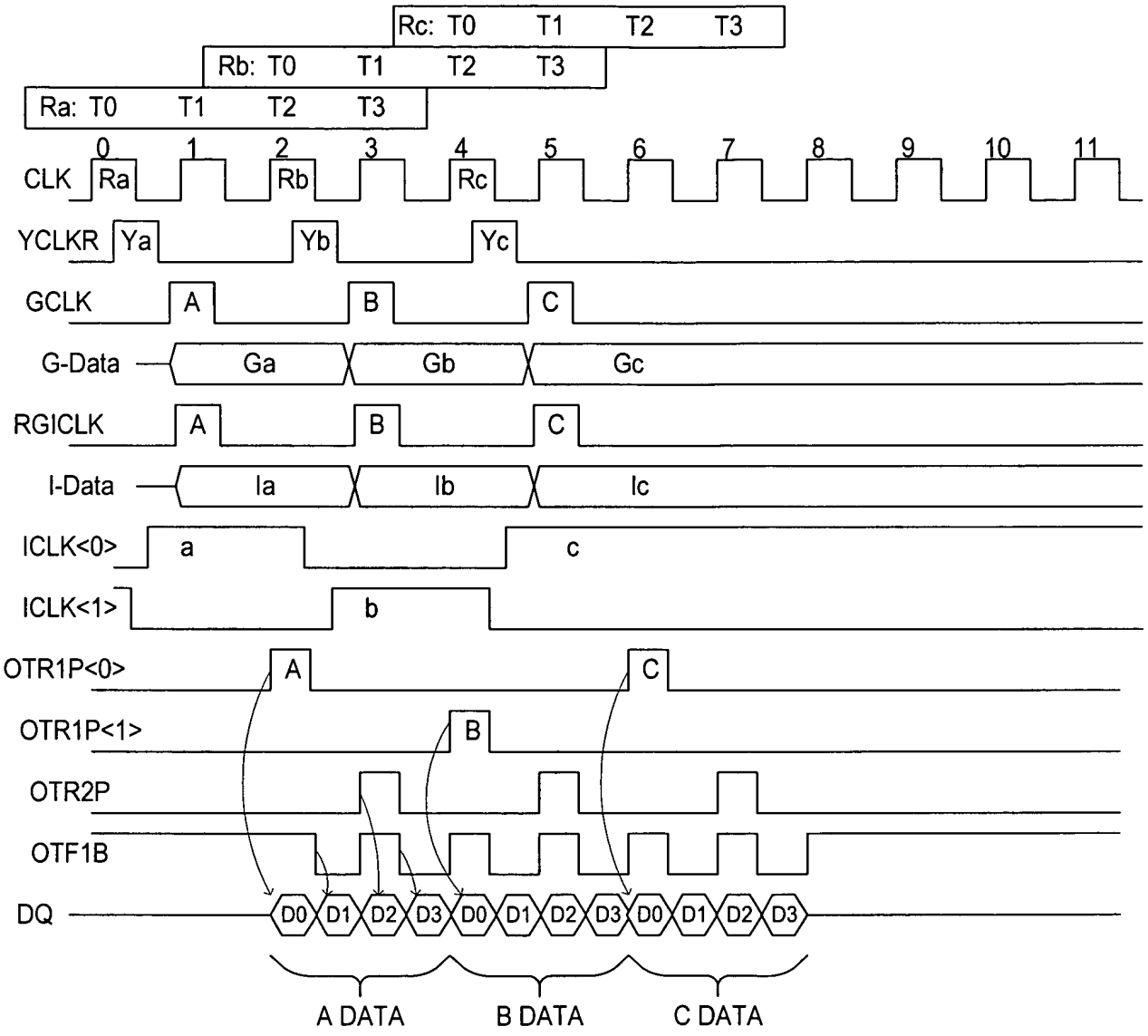


FIG. 7

DDR2 CL=3 READ

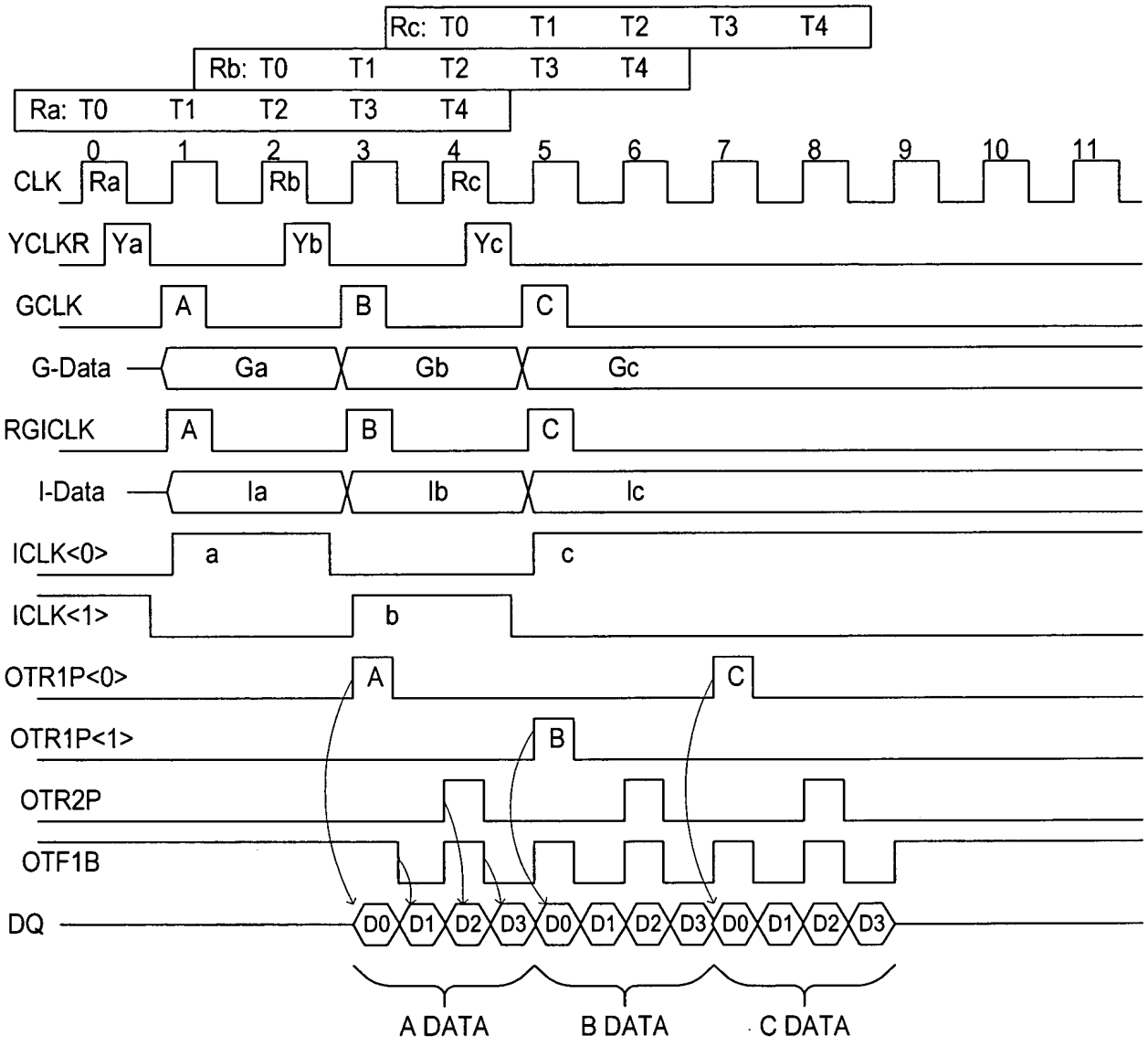


FIG. 8

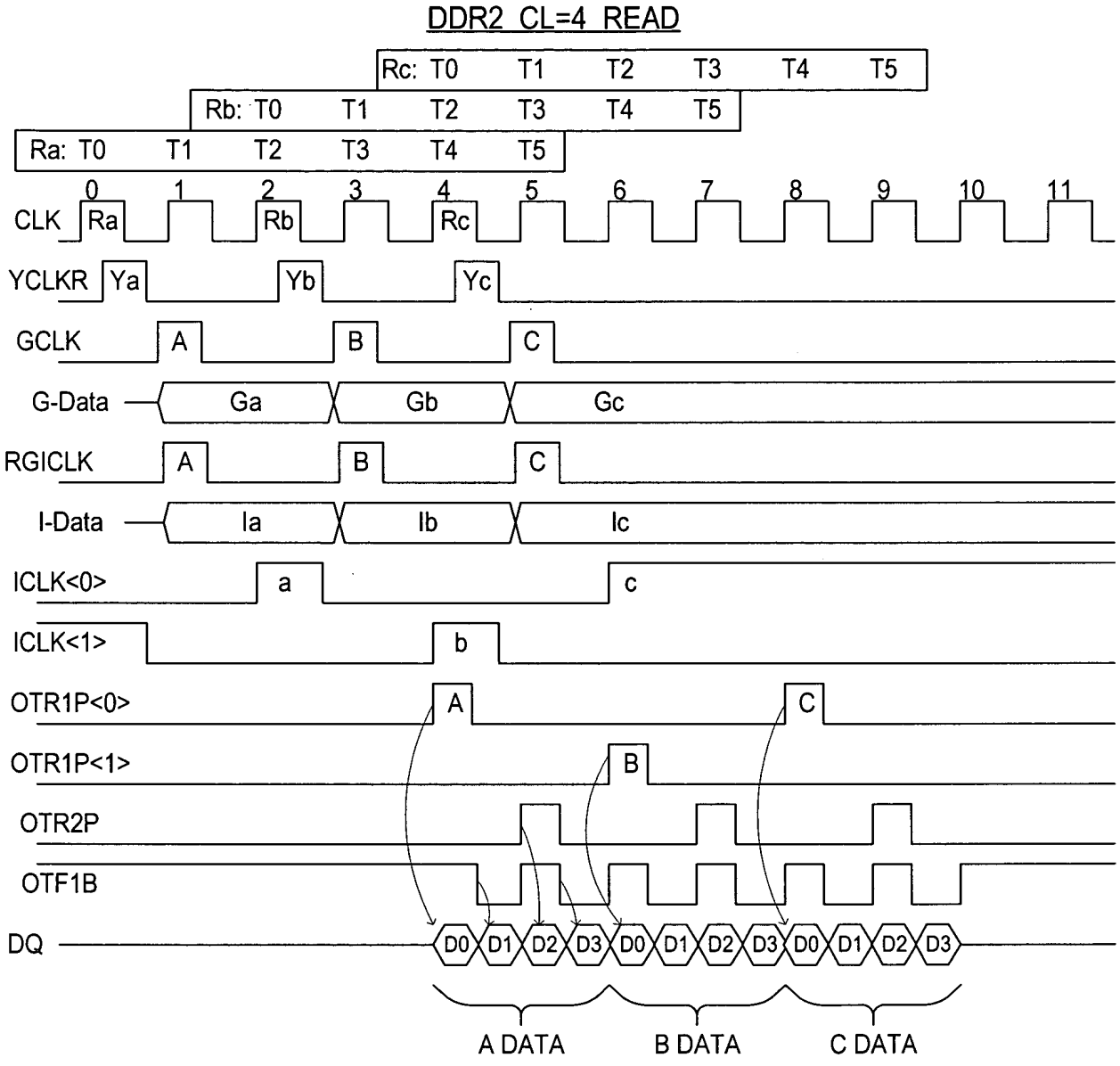
DDR2 CL=4 READ
Rc: T0 T1 T2 T3 T4 T5
Rb: T0 T1 T2 T3 T4 T5
Ra: T0 T1 T2 T3 T4 T5
0 1 2 3 4 5 6 7 8 9 10 11
CLK
Ra
Rb
Rc
YCLKR
Ya
Yb
Yc
GCLK
A
B
C
G-Data
Ga
Gb
Gc
RGICLK
A
B
C
I-Data
Ia
Ib
Ic
ICLK<0>
a
c
ICLK<1>
b
OTR1P<0>
A
C
OTR1P<1>
B
OTR2P
OTF1B
DQ
D0 D1 D2 D3 D0 D1 D2 D3 D0 D1 D2 D3
A DATA
B DATA
C DATA

FIG. 9

DDR2 CL=5 READ

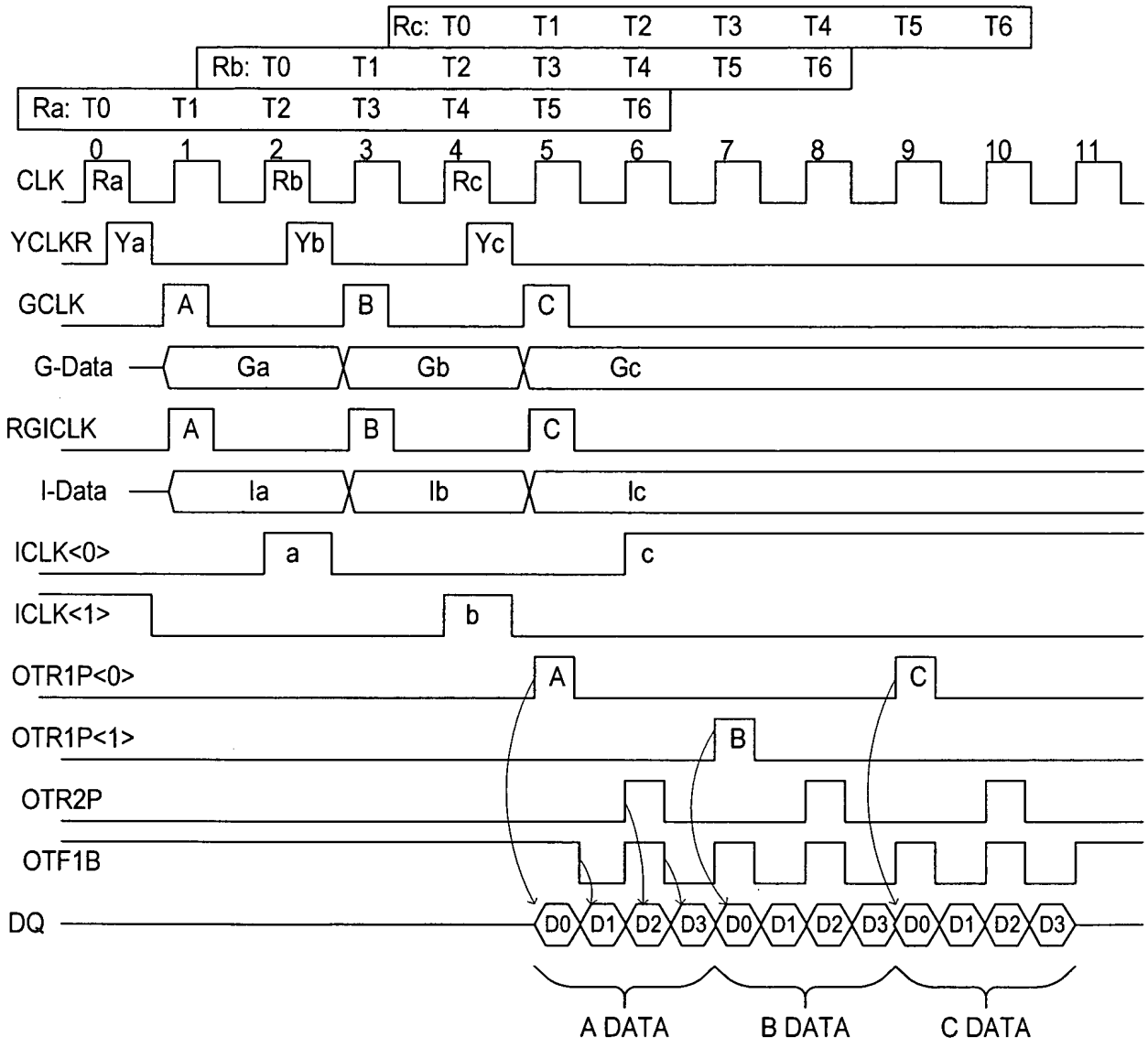


FIG. 10

DDR1 CL=2 READ

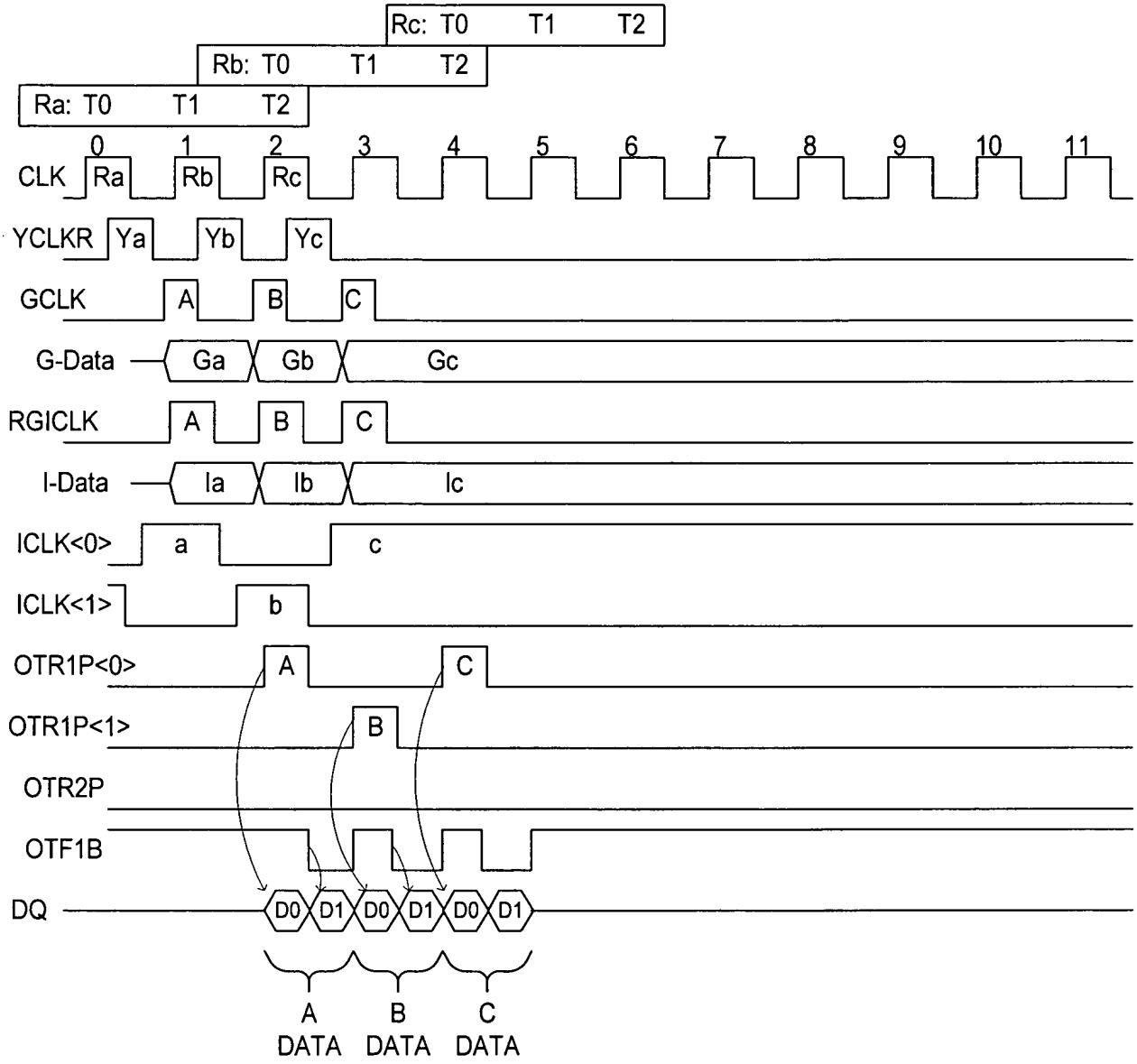


FIG. 11

DDR1 CL=2.5 READ

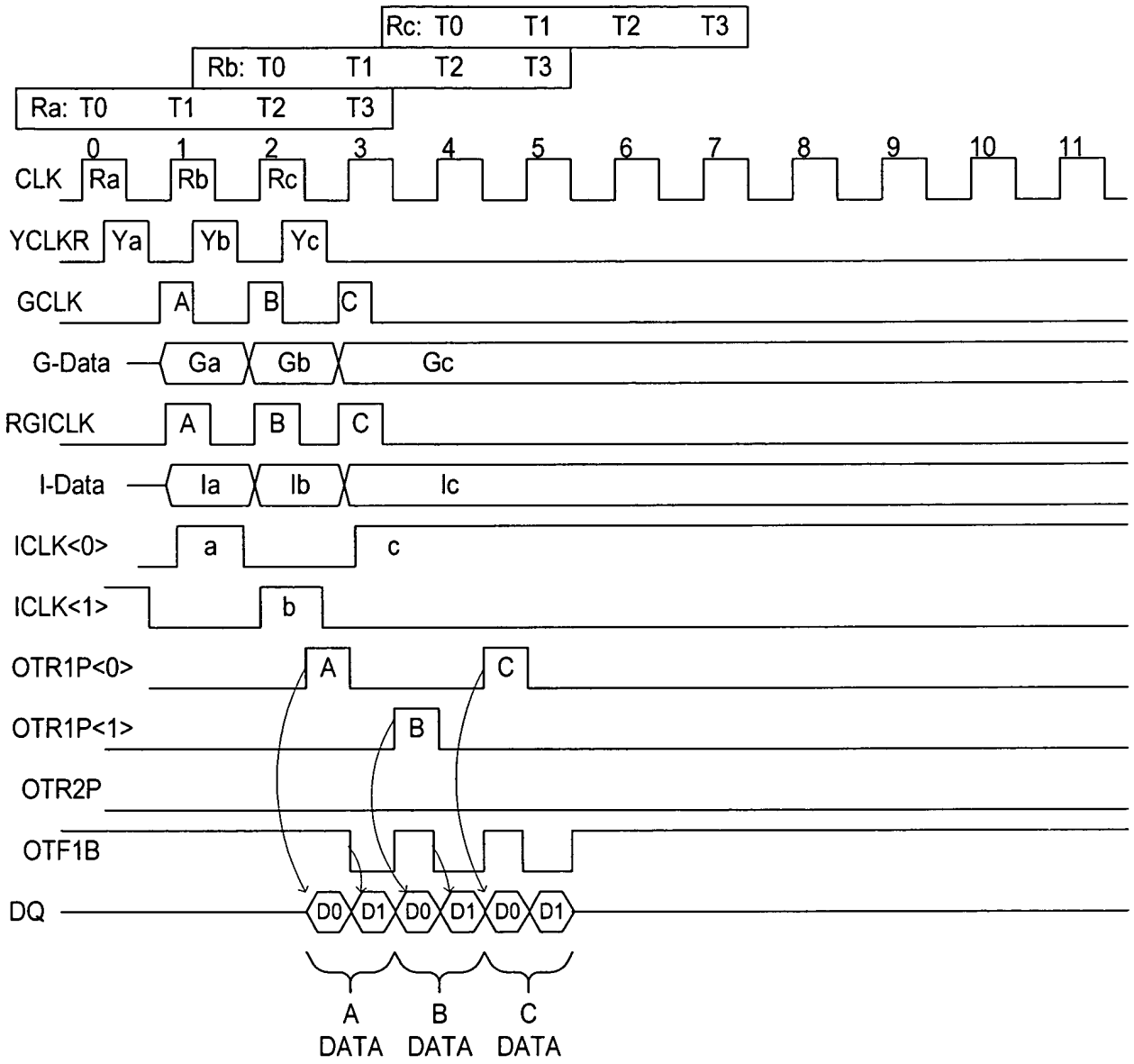


FIG. 12

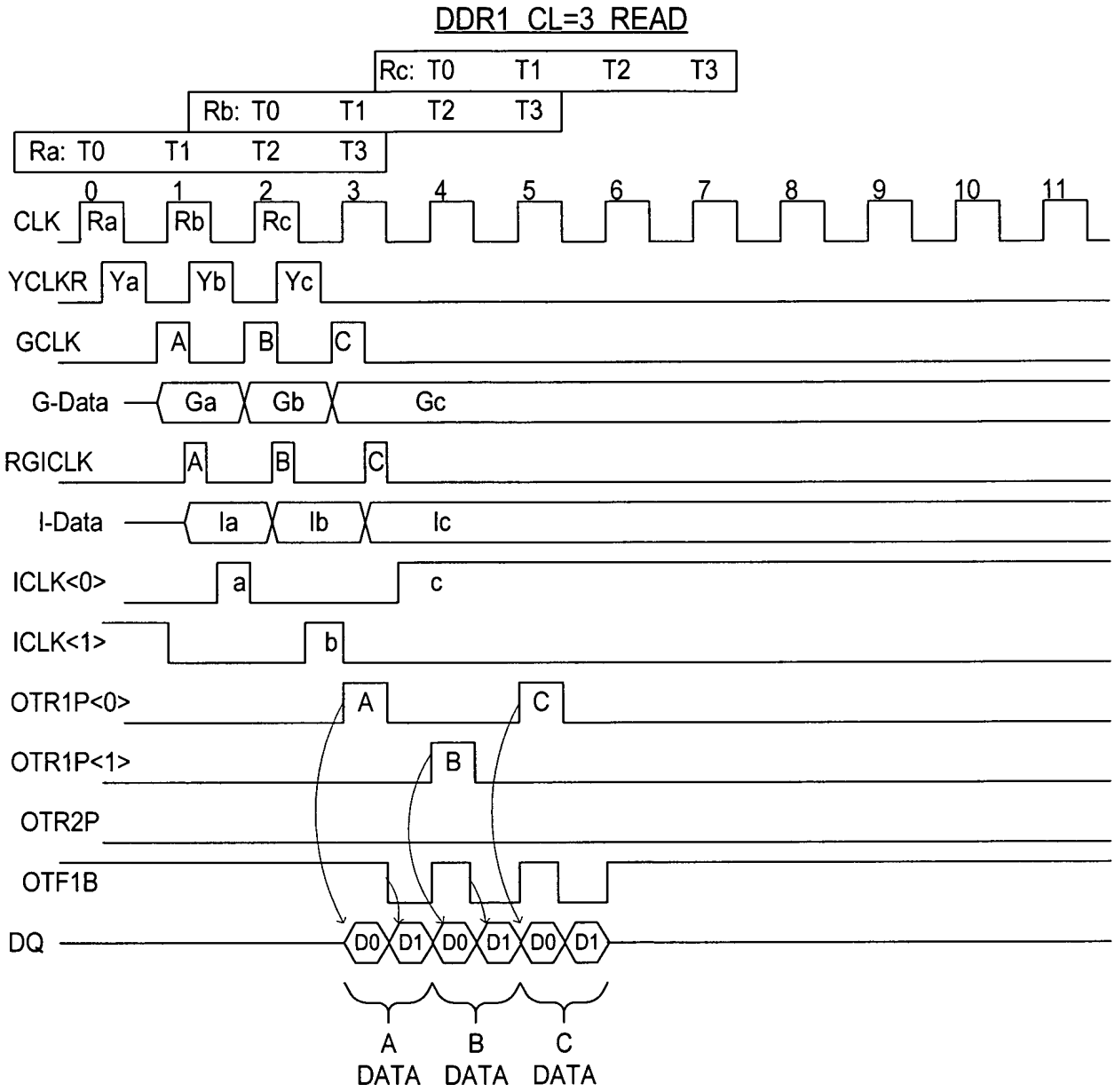
DDR1 CL=3 READ
Rc: T0 T1 T2 T3
Rb: T0 T1 T2 T3
Ra: T0 T1 T2 T3
0 1 2 3 4 5 6 7 8 9 10 11
CLK
Ra
Rb
Rc
YCLKR
Ya
Yb
Yc
GCLK
A
B
C
G-Data
Ga
Gb
Gc
RGICLK
A
B
C
I-Data
Ia
Ib
Ic
ICLK<0>
a
c
ICLK<1>
b
OTR1P<0>
A
C
OTR1P<1>
B
OTR2P
OTF1B
DQ
D0
D1
D0
D1
D0
D1
A DATA
B DATA
C DATA

FIG. 13

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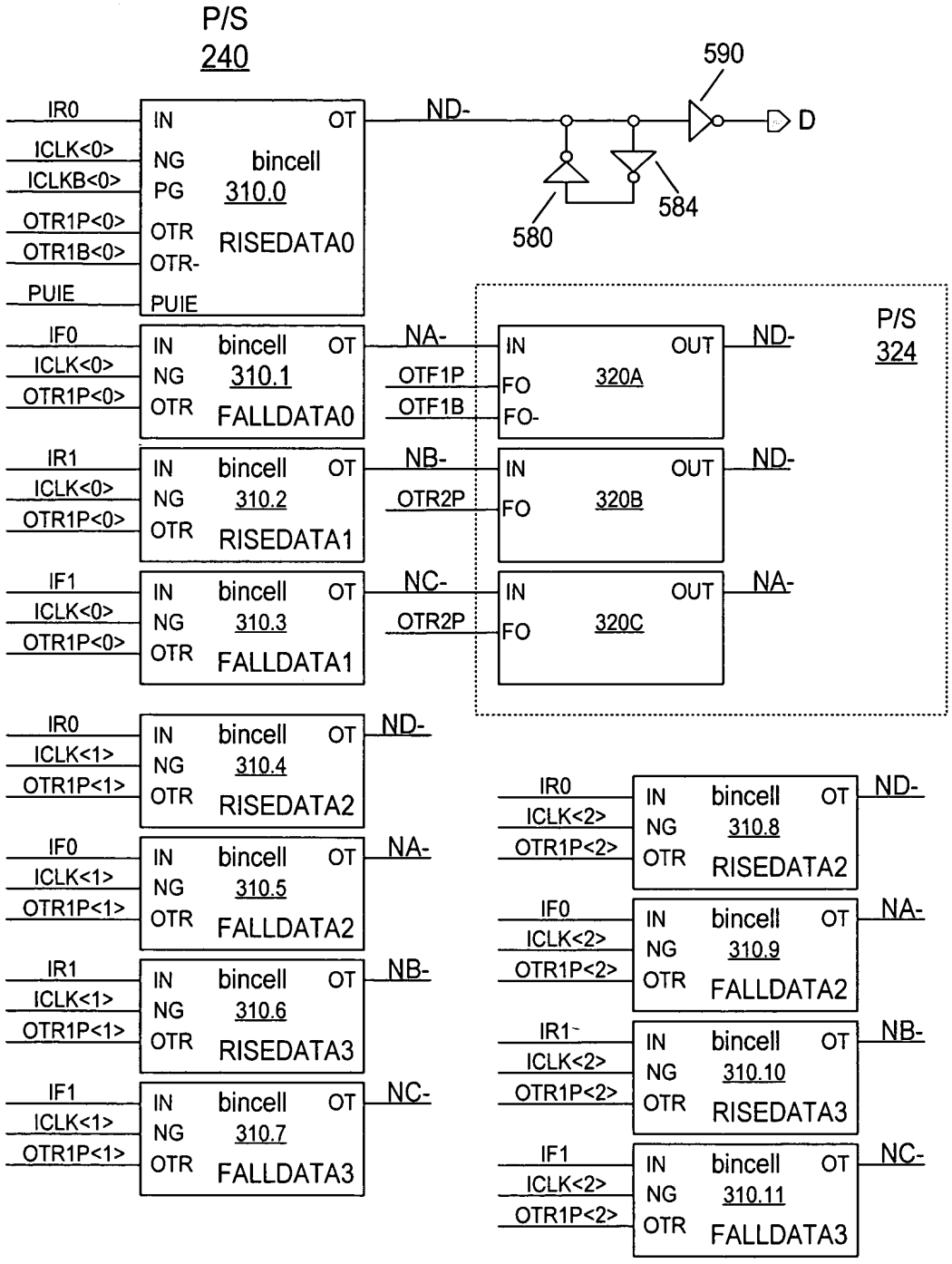
P/S
240
590
D
ND-
584
580
IR0
ICLK<0>
ICLKB<0>
OTR1P<0>
OTR1B<0>
PUIE
IN
NG
PG
OTR
OTR-
PUIE
OT
bincell
310.0
RISEDATA0
IF0
ICLK<0>
OTR1P<0>
bincell
310.1
FALLDATA0
NA-
OTF1P
OTF1B
FO
FO-
320A
OUT
ND-
P/S
324
IR1
ICLK<0>
OTR1P<0>
bincell
310.2
RISEDATA1
NB-
OTR2P
320B
IF1
ICLK<0>
OTR1P<0>
bincell
310.3
FALLDATA1
NC-
OTR2P
320C
NA-
IR0
ICLK<1>
OTR1P<1>
bincell
310.4
RISEDATA2
ND-
IF0
ICLK<1>
OTR1P<1>
bincell
310.5
FALLDATA2
NA-
IR1
ICLK<1>
OTR1P<1>
bincell
310.6
RISEDATA3
NB-
IF1
ICLK<1>
OTR1P<1>
bincell
310.7
FALLDATA3
NC-
IR0
ICLK<2>
OTR1P<2>
bincell
310.8
RISEDATA2
ND-
IF0
ICLK<2>
OTR1P<2>
bincell
310.9
FALLDATA2
NA-
IR1
ICLK<2>
OTR1P<2>
bincell
310.10
RISEDATA3
NB-
IF1
ICLK<2>
OTR1P<2>
bincell
310.11
FALLDATA3
NC-

FIG. 14

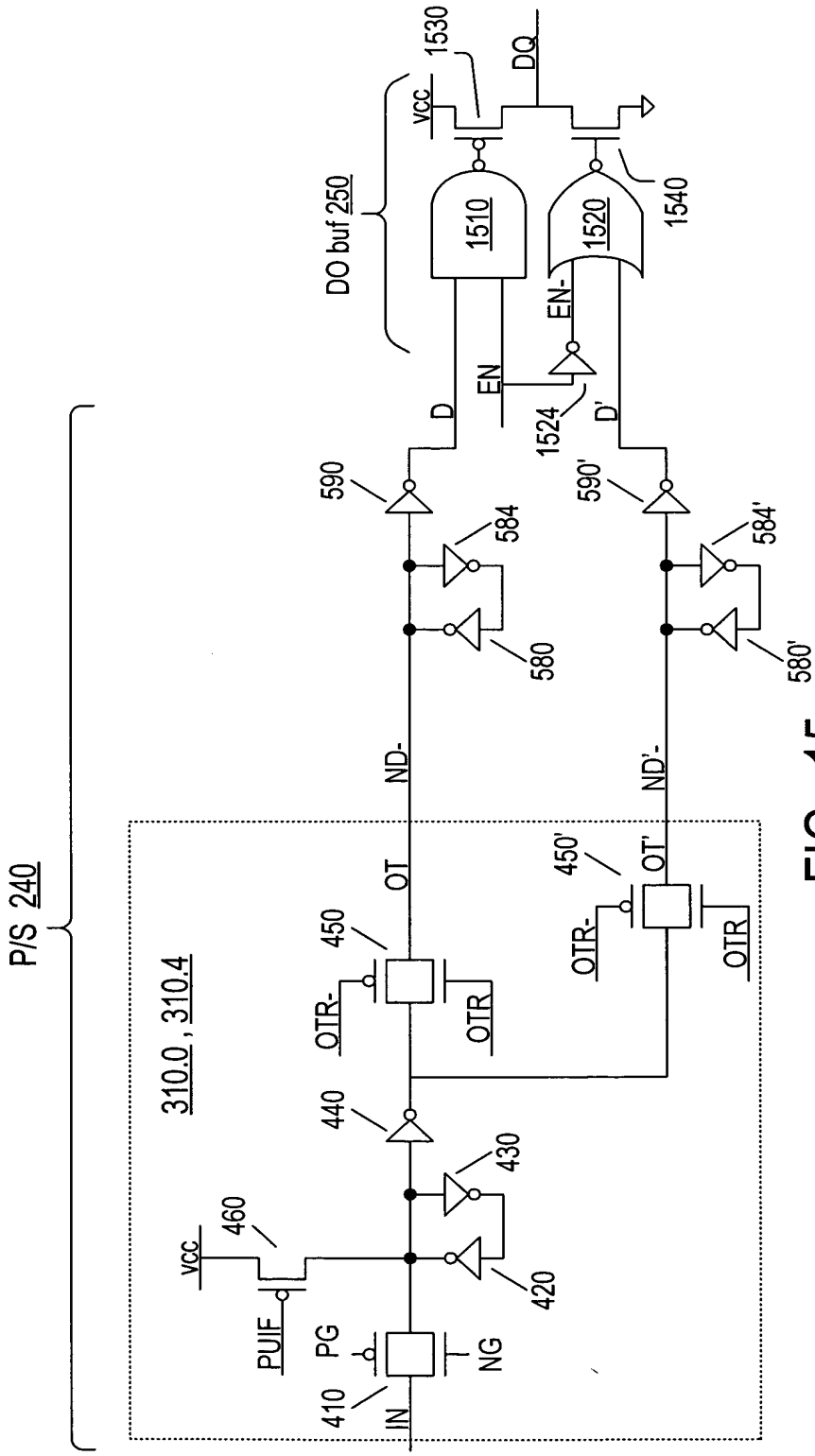
P/S 240
310.0 , 310.4
DO buf 250
1530
DQ
vcc
1510
1520
1540
EN-
EN
D
D'
1524
590
590'
584
584'
580
580'
ND-
ND'-
OT
OT'
450
450'
OTR-
OTR
440
430
420
460
PUIF
PG
NG
410
IN

FIG. 15

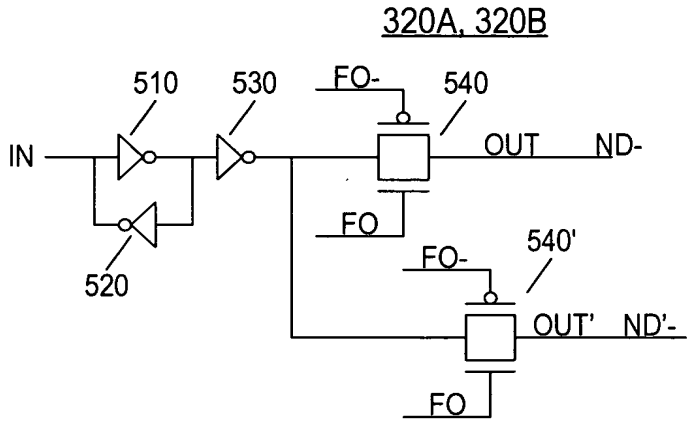
320A, 320B
510
530
FO-
540
IN
OUT
ND-
FO
520
FO-
540'
OUT'
ND'-
FO

FIG. 16

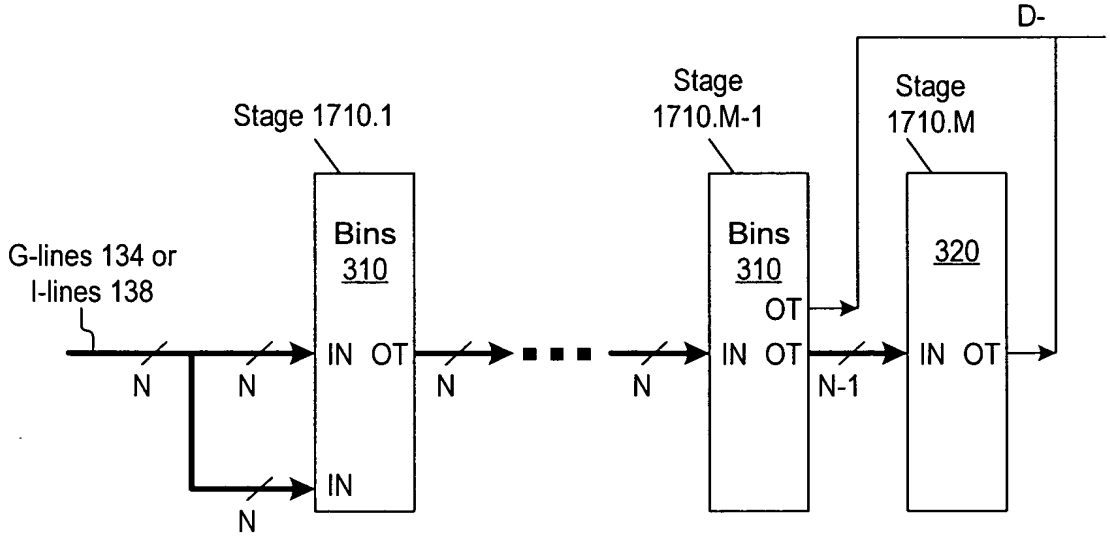
D-
Stage 1710.1
Stage 1710.M-1
Stage 1710.M
G-lines 134 or I-lines 138
Bins 310
Bins 310
320
IN OT
IN OT
IN OT
OT
IN
N
N
N
N
N
N-1

FIG. 17